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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,176	01/22/2002	Thomas Ducellier	10-498 US	9693

7590 06/19/2003

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EXAMINER

VALENCIA, DANIEL E

ART UNIT PAPER NUMBER

2874

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/051,176

Applicant(s)

DUCELLIER ET AL.

Examiner

Daniel E Valencia

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

## **DETAILED ACTION**

### ***Inventorship***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4, 5, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Smith U.S. Patent Application Publication 2002/0071627. Refer to the appropriate drawings or parts of the specification. Regarding claims 1, 4, 5, and 17, Smith discloses a fiber optic wavelength switch (fig. 5 and 6) comprising: a front-end (52-66) unit having a plurality of optical ports (52, 54, 56, 58); said front-end unit comprising: a fiber array (fig. 13, 162, 164, 166, 168) comprising a plurality of fibers coupled to the plurality of optical ports for transmitting and receiving optical signals; (ii) a micro-lens array (paragraph 80) having a plurality of micro-lens, each micro-lens being coupled to a respective fiber; and a lens (68) for receiving and redirecting the optical signals from the micro-lens array; a wavelength dispersion element (70) defining a dispersion plane; a light re-directing element (74) associated with the wavelength dispersion element; and an actuation array (78) operative with the light redirecting element for tilting the optical signals substantially perpendicular to the dispersion plane defined by the wavelength dispersion element, wherein the actuation array is a MEMS (paragraph 29) movable reflector array and the output ports are related to the angular displacement of the light to and from the MEMS array.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Rose U.S. Patent Application Publication 2002/0154855. Smith as applied above discloses an optical wavelength switch with a majority of the limitations of the claimed invention; however the reference fails to disclose the use of a polarization module and the use of a spherical reflector.

On the other hand, Rose discloses a wavelength division multiplexed device that teaches the limitations that the Smith reference lacks. Specifically, Rose discloses a front-end input (fig. 24) including a polarization diversity module (2410) having at least one wave plate (2424) for splitting the optical signal into two sub-signals having substantially the same polarization state, as explained in claims 2 and 18. Referring to claims 3 and 19, Rose discloses that the dispersion element is a diffraction grating and the redirecting element is a spherical reflector (220). Rose teaches that it is advantageous to use a polarization diversity module, because it provides that the two sub-signals are in the preferred polarization state for maximum diffraction efficiency (paragraph 0136). Additionally, Rose teaches that a spherical reflector allows different channels to be focused onto one region (paragraph 68). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a diversity polarization module and a spherical reflector in the device disclosed by Smith.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Bishop U.S. Patent No. 6,263,123. Smith as applied above, discloses an optical wavelength switch with a majority of the limitations of the claimed invention; however the reference fails to disclose the use of a liquid crystal display having a plurality of pixels.

On the other hand, Bishop discloses a similar wavelength switch that includes an array of pixels as the actuation array (fig. 2, 24), as mentioned in claim 6. Referring to claim 7, Bishop further discloses that an addressing module selects an angle of deflection to provide a signal to one of the plurality of optical ports (col. 4, lines 25-55), as explained in claim 8. Bishop teaches that it is advantageous to use a pixel array as the actuation array, because each pixel can be controlled electrostatically by the controller using an addressing system (col. 3, lines 63-bottom). Both Smith and Bishop disclose devices for switching wavelength channels. Additionally, the MEMS mirror array in Smith and the pixel array in Bishop perform essentially the same function. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use pixels instead of a MEMS array in the device disclosed by Smith.

Claims 8-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikes U.S. Patent No. 6,522,404 in view of Phillippe European Patent No. EP 0 859 249. Refer to the appropriate drawings or parts of the specification. Mikes discloses a grating based communication switch with a majority of the limitations of the claimed invention. Regarding parts of claim 8, Mikes discloses a WDM signal input (fig. 3) at a

front-end (304), a light redirecting element (330) having a focal plane for receiving the beam of light launched from the first port; a wavelength dispersion element (340) defining a dispersion plane and disposed substantially at the focal plane of the light redirecting element for spatially dispersing a reflected beam of light from the light redirecting element and for redirecting the spatially dispersed beam of light back to a light redirecting element; and an actuation array (360) disposed at the focal plane of the light redirecting element for modifying the spatially dispersed beam of light reflected from the light redirecting element in a direction substantially perpendicular to the dispersion plane defined by the wavelength dispersion element and for reflecting the modified spatially dispersed beam back to the second port (308) of the front end unit through the light redirecting element and the wavelength dispersion element. With reference to part of claim 14, Mikes discloses a similar embodiment that uses a first (30) and second (80) wavelength dispersion device and a first (20) and second (90) light-redirecting device that functions essentially in the same manner. As to claims 10, 11, and 16, Mike discloses that the dispersion element is a grating, the redirecting element is a spherical reflector (fig 8), and the actuation array is a MEMS device having a plurality of reflectors.

However; Mikes fails to disclose the claimed configuration of the front-end as well as the polarization diversity module. On the other hand, Philippe discloses an optical fiber wavelength multiplexer and demultiplexer that teaches the limitations that the Mikes reference lacks. Specifically, Philippe discloses a front-end (fig. 4 and 5) with a plurality of fibers (101-105) coupled to a micro-lens (163, 171, 172, etc) array and a lens

(108) for receiving and redirecting the beams of light to the redirecting element, as described by parts of claims 8 and 14. Philippe teaches that it is advantageous to use a micro-lens array coupled to the corresponding plurality of fibers, because it allows the optical signal to be focused to and from the fiber core (col. 5, lines 1-17). In addition, Philippe teaches that the other (collimating) lens is advantageous because it collimates all the optical beams to the same part of the wavelength dispersive element (col. 5, lines 45-50). Because both references disclose devices that switch wavelengths using diffraction gratings and MEMS devices, the references are combinable. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a plurality of fibers, corresponding micro-lenses, and a collimating lens as the input to the device disclosed by Mikes.

With reference to claims 9 and 15, Philippe discloses that the first port includes a polarization diversity module (fig. 8 and 9) having at least one wave plate (202) for splitting the beam of light launched from the first port into two sub-beams having substantially the same polarization state. Philippe teaches that this is advantageous, because the configuration beings the sub beams will be linearly polarized when incident on the wavelength dispersion element thus saving energy (col. 8, lines 35-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a polarization diversity element in the device disclosed by Mikes.

Regarding method claims 12 and 13, using the device disclosed by Mikes and Philippe would have inherently carried out the steps described in the claims.



Examiner would also point out that the plural fiber to micro lens to collimating lens configuration is well-known input and output configuration in the optical wavelength switching art. An ordinarily skilled artisan would recognize that an input WDM signal could be replaced by a multi-wavelength input employing plural fibers, lenses, and a collimating lens. Therefore, it would have been obvious to one of ordinary skill at the time of invention.

### ***Conclusion***

The prior art documents submitted by the applicant in the Information Disclosure Statement filed on December 4, 2002, have all been considered and made of record (note attached copy of form PTO-1449).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Solgaard U.S. Patent Application Publication 2002/0061160 discloses a wavelength switch such as the one claimed by the present invention including the well-known input/output configuration of utilizing a micro lens array and a collimating lens.

Cao U.S. Patent Application Publication 2003/0002791 discloses an apparatus for multiplexing signals including a polarization diversity module with a wave plate.

Dragone U.S. Patent No. 6,263,127 discloses a free space waveguide router that utilizes a MEMS array in conjunction with a wavelength dispersion device.

Ford U.S. Patent No. 6,097,519 discloses a fiber optic network for multiplexing and demultiplexing channels including a MEMS array and a grating.

Brophy U.S. Patent No. 6,532,318 discloses a symmetric wavelength selective switch for interconnecting two WDM rings including a polarization diversity module, a wavelength dispersion element, and a MEMS array.

Chen U.S. Patent Application Publication 2002/0131688 discloses an optical add-drop switch utilizing a MEMS array and a grating.

Ford U.S. Patent No. 6,337,935 discloses a dispersed image inverting optical wavelength multiplexer including a MEMS array, a dispersive element and a plurality of fibers and micro lens array as the front-end.

Sappey U.S. Patent No. 6,415,080 discloses a dense wavelength division multiplexer that uses a grating, a spherical reflector, and a prism.

Weverka U.S. Patent No. 6,501,877 discloses a wavelength router including a MEMS array and a grating.

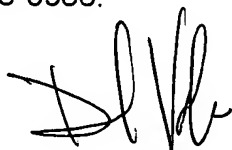
Aksyuk U.S. Patent No. 6,204,946 discloses a WDM add drop device using micromirrors a grating and collimating lenses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel E Valencia whose telephone number is (703)-305-4399. The examiner can normally be reached on Monday-Friday 9:30-6:00.

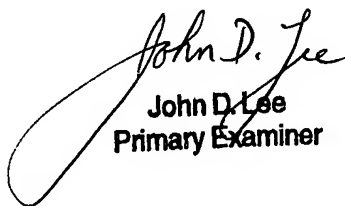
Art Unit: 2874

The fax phone numbers for the organization where this application or proceeding is assigned are (703)-308-7724 for regular communications and (703)-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

A handwritten signature in black ink, appearing to be 'DEV' followed by a stylized flourish.

DEV  
June 11, 2003

A handwritten signature in black ink, reading 'John D. Lee' in a cursive style.

John D. Lee  
Primary Examiner